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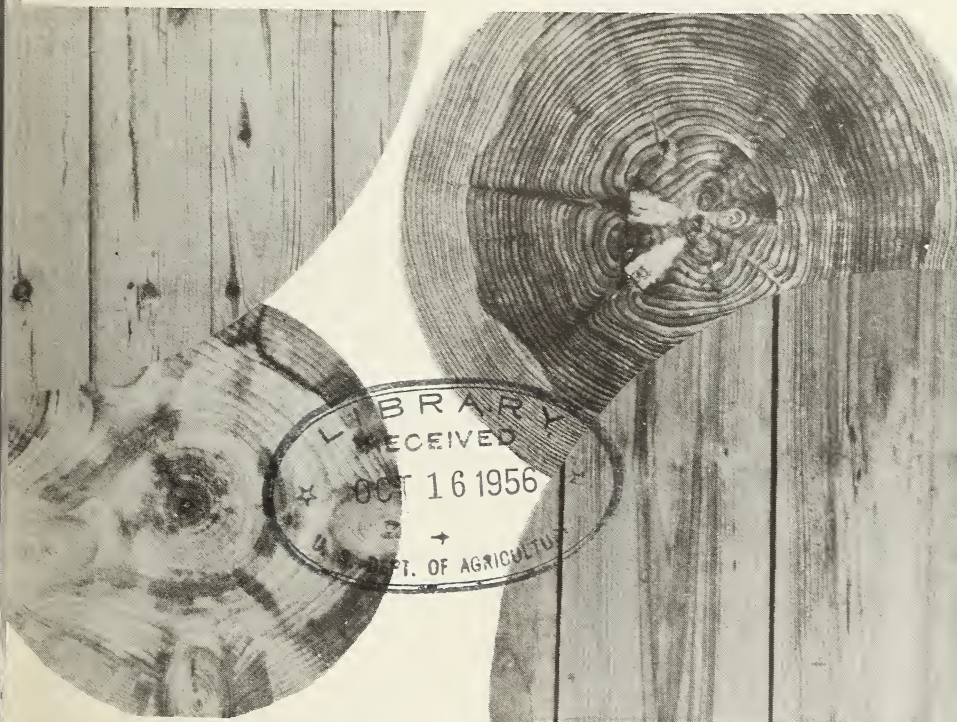
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# KNOTS vs. CLEAR LUMBER

Picturing the influence of pruning --  
good, bad, and indifferent.

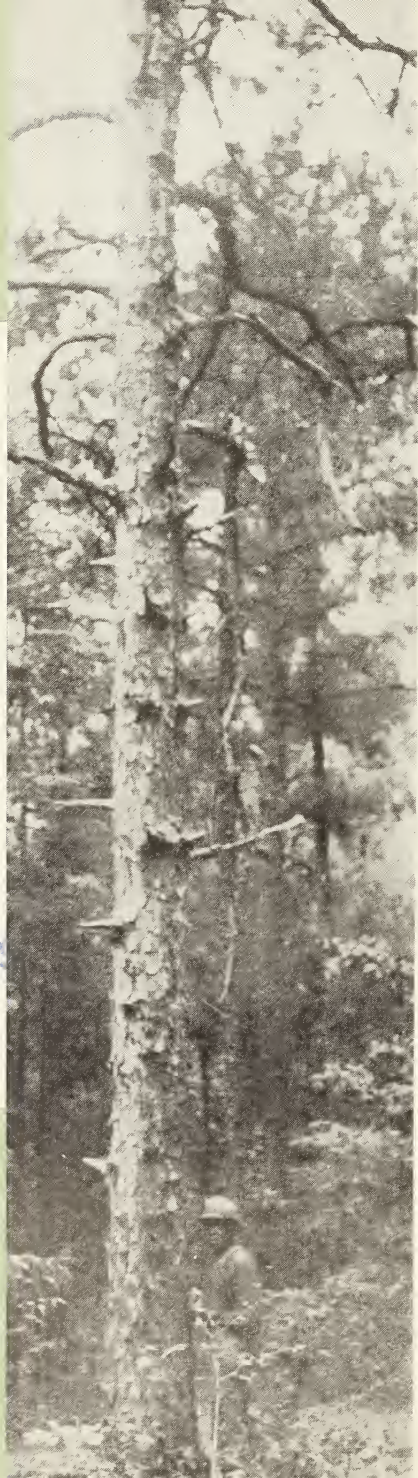


Forest Products Laboratory, Madison, Wis.

Forest Service

U.S. Department of Agriculture





**LEAR LUMBER** as produced in American sawmills is cut principally from virgin-growth timber 200 to 500 years of age and upwards. The clear wood was formed only in the outer layers of the lower part of the tree trunks. Many of the trees were of saw-log size before they produced any clear lumber — for Nature's method of producing clear wood is exceedingly slow, in fact Nature is not much concerned with producing clear lumber.

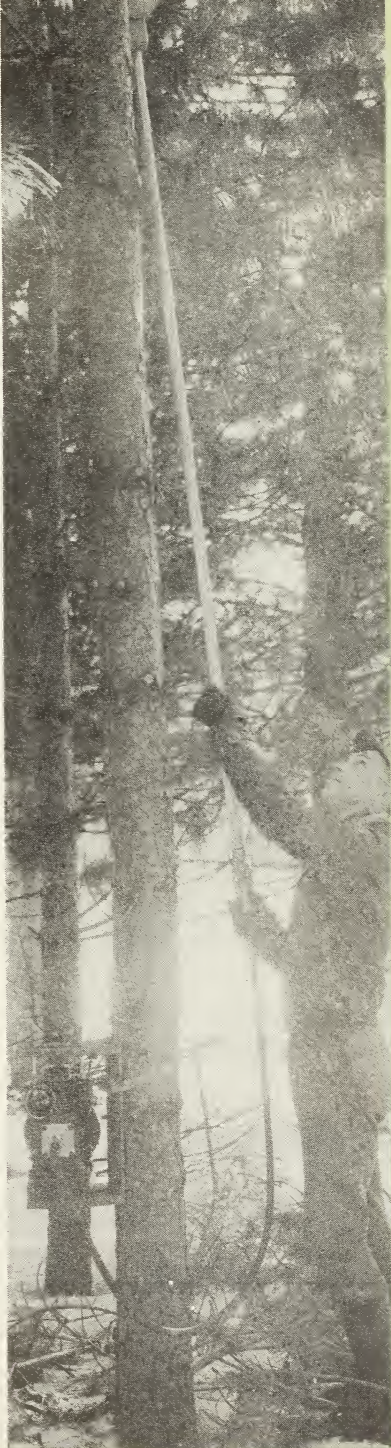
In the more closely stocked stands, the death of the side branches from lack of sunlight is the first step in this snail's pace process. Then, through a process of disintegration and decay frequently exceeding the lifetime of a man, the dead branches gradually weaken and, unable to bear their own weight, drop to the ground, leaving irregular stubs of varying lengths that often cling to the trunk for 50 to 100 years before they grow over. Later when the trees are cut for lumber these persistent branches appear as knots and cause serious de-grade.

The yield of high quality lumber from second-growth stands is surprisingly low. Investigations show that several of our more important commercial softwoods will yield only low-grade lumber in rotations of 60 to 80 years, even in fully stocked stands and plantations. Many of our second-growth stands are understocked and in such areas natural pruning of the trees will not take place. With a constantly increasing proportion

of second growth in our American forests, the problem of improving the quality of timber and at the same time decreasing the rotation period in order to meet our National timber requirements is being given very serious consideration by the U. S. Forest Service in different parts of the country.

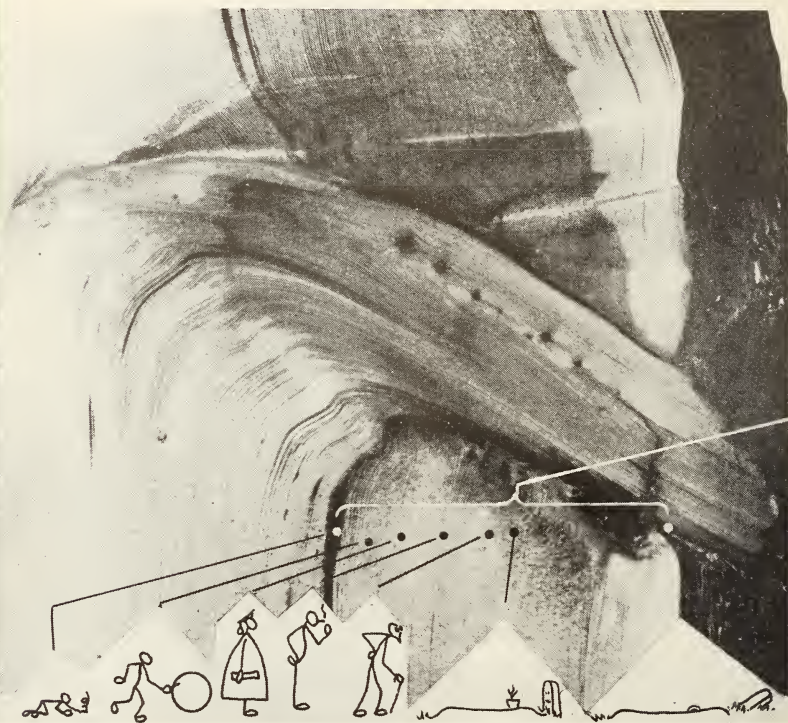
As a part of a research program dealing with the influence of growth conditions upon wood quality, the Forest Products Laboratory is making a detailed study of the development of knots in timber trees and the advantages that may be derived by the removal of the lower branches while the trees are small. Knots in trees are carefully analyzed with respect to the number, age, size, slope, and soundness of the live and dead portions from which their influence upon the grades of lumber is determined. A study of the formation of wood in trees pruned accidentally or by design years ago gives valuable indications of the relative efficiency of various methods of pruning and what may be expected of them in improving lumber quality of the various species. Pruned trees contain only clear lumber outside the knotty core, hence they should prove a source of "certified" wood for rotary-cut veneer and other uses requiring clear stock.

This booklet tells pictorially the story of the formation of knots in trees and how clear lumber follows removal of limbs.





**WHERE PRUNING IS LEFT TO NATURE -- YEARS**



**240  
years  
elapsed  
since  
limb  
died**

### **Virgin-Growth Tree With Knot 375 Years Old**

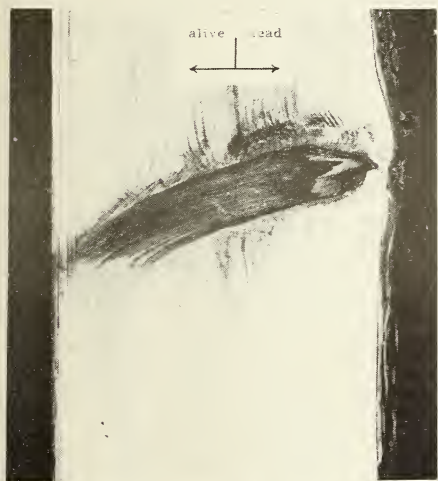
**"Nature has taken no account of time or space,  
nor did she care whether the forest was composed  
of timbers most useful to man; tree growth, what-  
ever the kind, satisfied her laws."**

**---B. E. Fernow.**



# OFTEN ELAPSE BEFORE CLEAR LUMBER IS FORMED

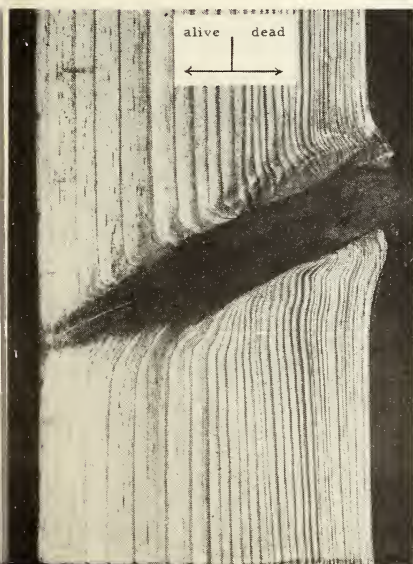
**Norway pine--  
knot 61 years old**



**Loblolly pine--  
knot 35 years old**

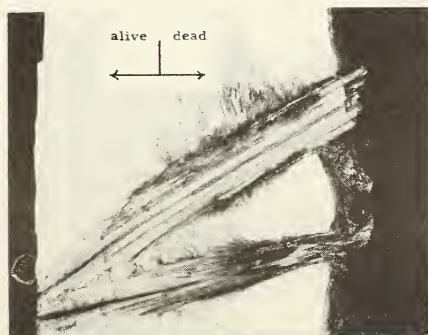


## Typical Knots In Second-Growth Trees



← **Shortleaf pine--  
knot 36 years old**

**Plantation white pine--  
knot 33 years old**



# **Plantation of Norway and White Pine**

**Before pruning** →

**After pruning**  
↓



**"It needs the aid  
of man to clear out  
the dead wood and  
encourage only the  
growth that will  
best serve the na-  
tional need in the  
days to come."**

**---Franklin D.  
Roosevelt.**





↑  
**Long stubs and splin-**  
**ters are the earmarks**  
**of poor pruning**

**Close pruning permits**  
**immediate formation →**  
**of clear lumber**





**Pruning**

**Done**

**Tree**

**Sn**



**Not pruned**



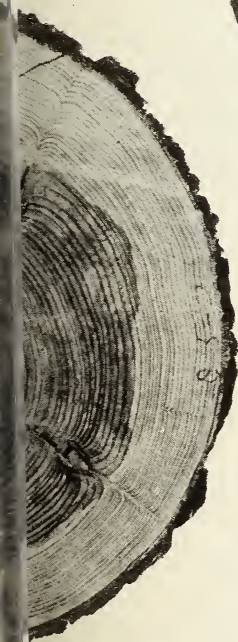
**Pruned when 7'**

**clear lumber produced**

ould Be  
When  
Are  
11



**Pruned when 3 inches in diameter---  
clear lumber produced for 42 years**



ies in diameter---  
ed for 22 years

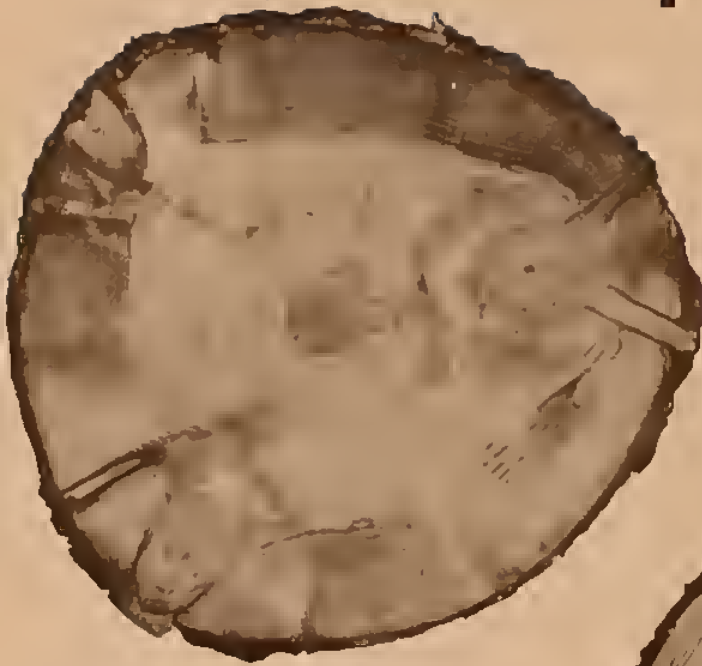
**" . . . . . as a forester I am  
meant to raise trees, partly  
by planting, partly by lend-  
ing Nature a helping hand."**

**---C. A. Schenck**





**Pruning Should Be  
Done When  
Trees Are  
Small**



**Not pruned**



**Pruned when 3 inches in diameter---  
clear lumber produced for 42 years**

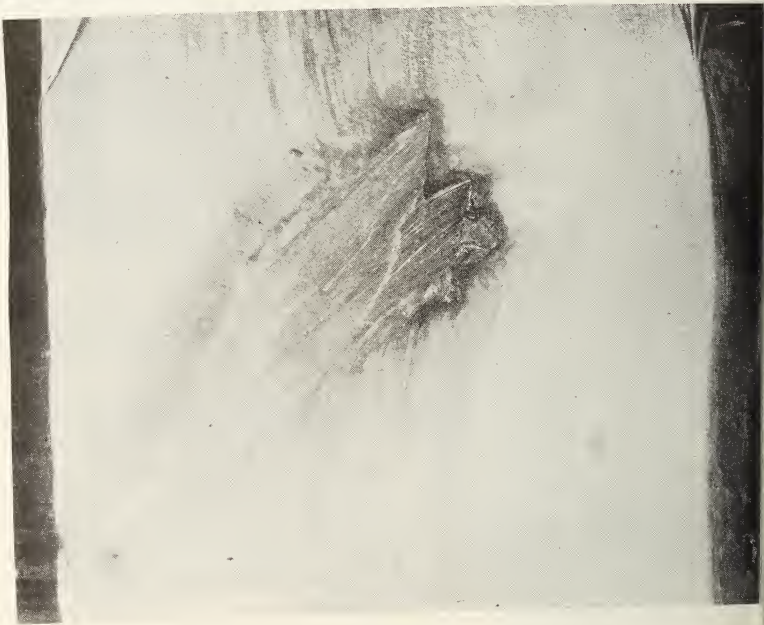


**Pruned when 7 inches in diameter---  
clear lumber produced for 22 years**

**"..... as a forester I am  
meant to raise trees, partly  
by planting, partly by lend-  
ing Nature a helping hand."  
---C. A. Schenck**

# Results of

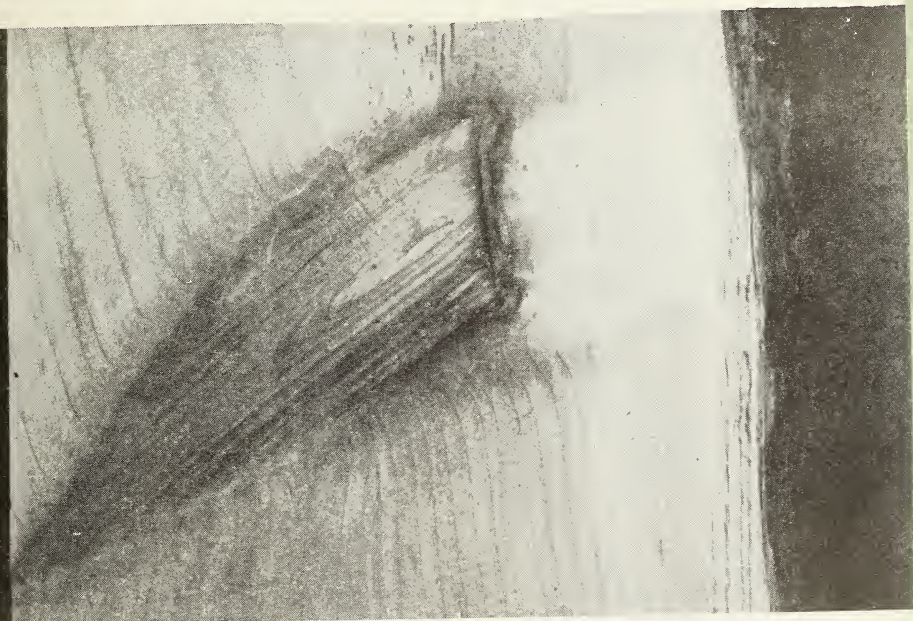
**CLUBBED**



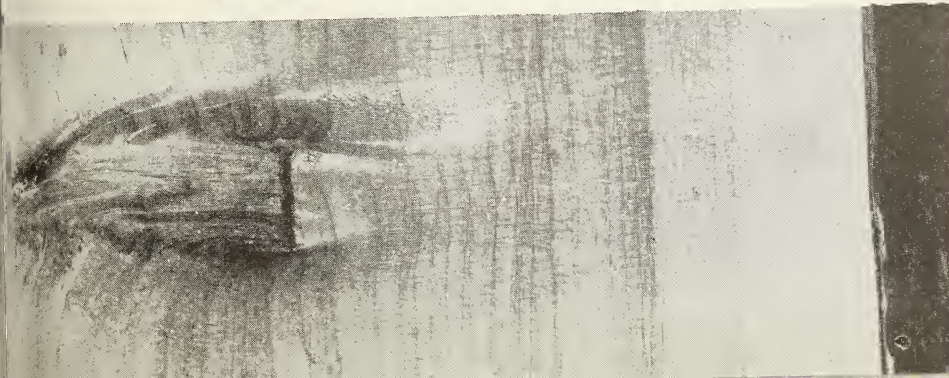
**AXED**

# Different Methods of Pruning

**SAWED---but too late**



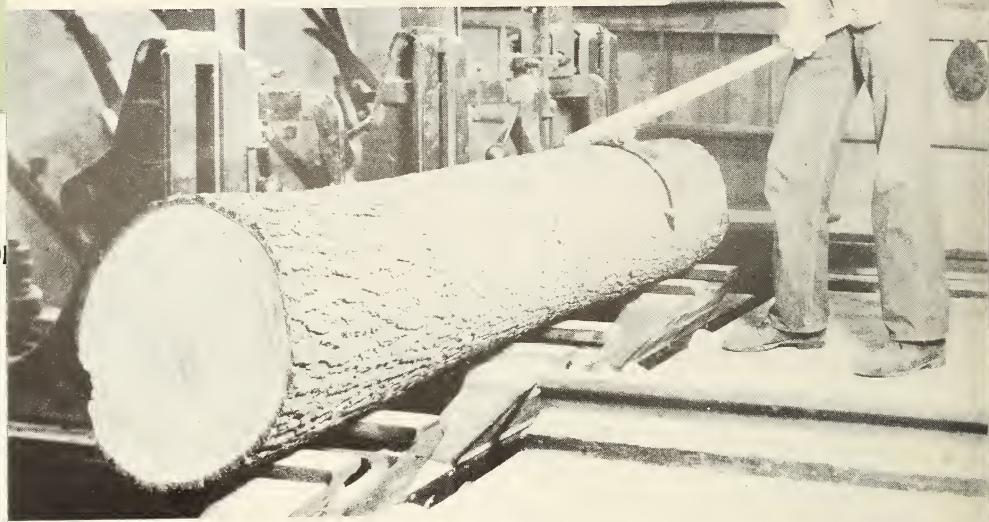
**SAWED---in time for the formation of much clear lumber**





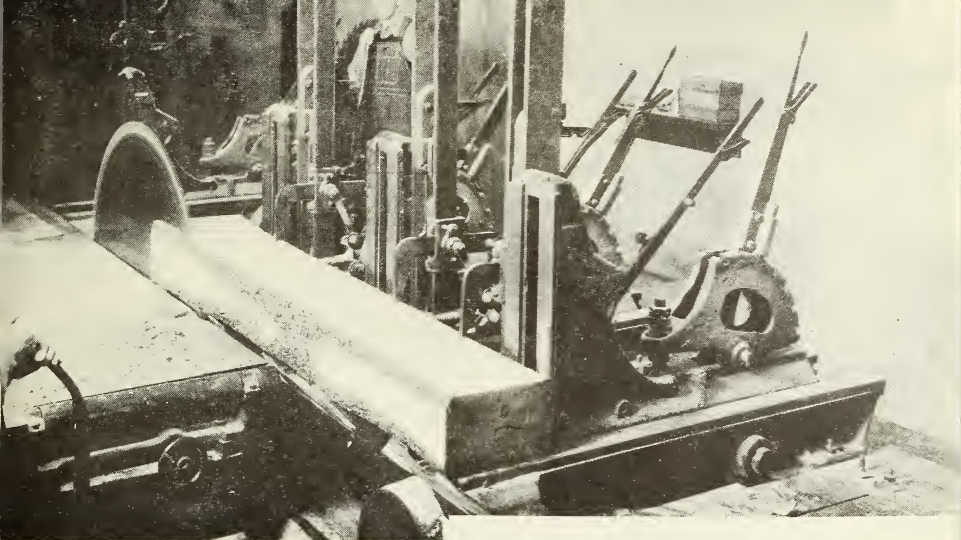
# White pine pruned

## 40 years ago . . .

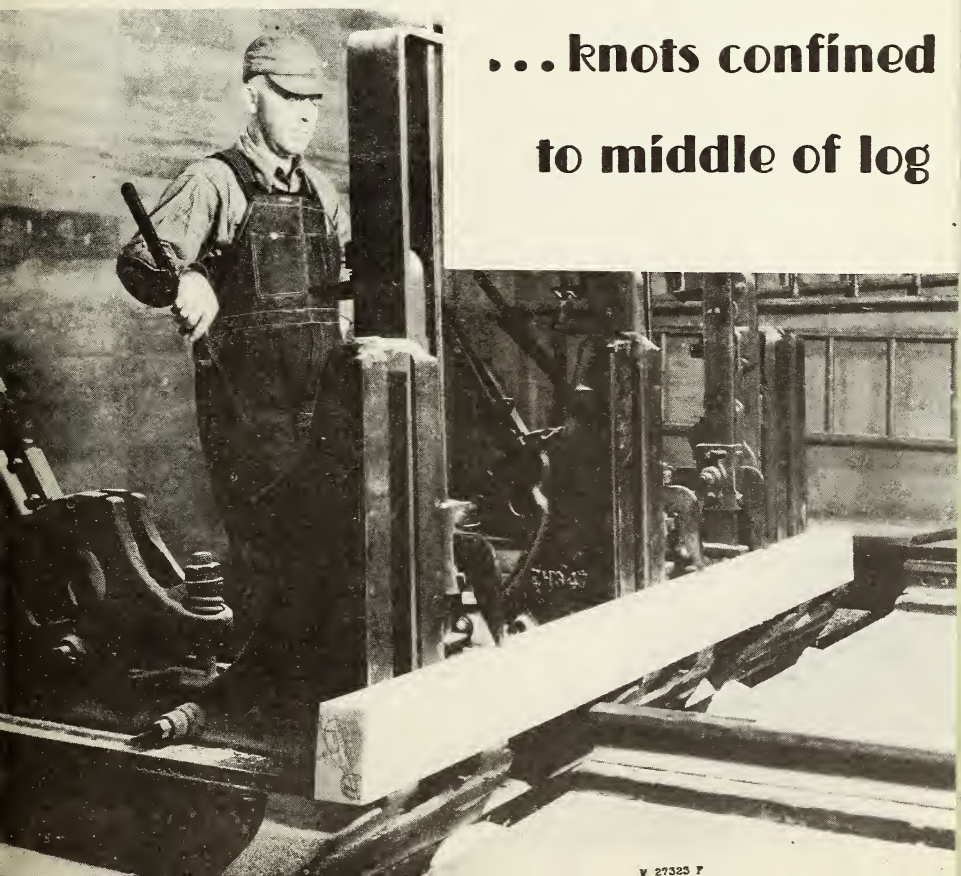


"---It is not wood simply that is wanted, but wood of certain quality useful for given purposes."

---B. E. Fernow



**... knots confined  
to middle of log**





Pruning makes the B and Better —

DI

B

9



The background of the image consists of several vertical wooden planks. The wood has a natural, weathered appearance with various knots and grain patterns visible. A diagonal white banner cuts across the lower half of the image, starting from the left edge and extending towards the bottom right. On this banner, the text "and want of it the Commons" is written in a black, handwritten-style font. The banner is slightly wider than the text it carries, creating a white border around the words.

— and want of it the Commons

## FOR BETTER UTILIZATION OF WOOD

THE FOREST PRODUCTS LABORATORY is the only institution of its kind maintained by the Federal Forest Service, United States Department of Agriculture. It functions in cooperation with the University of Wisconsin. Its business is —  
*To Aid in Protecting and Enhancing the Value and Marketability of Forest Products.*



THE FOREST PRODUCTS LABORATORY

*"Wise Timber Use is the Best Timber Conservation"*

